NIPPON VALVE CONTROLS, INC.

Instruction manual

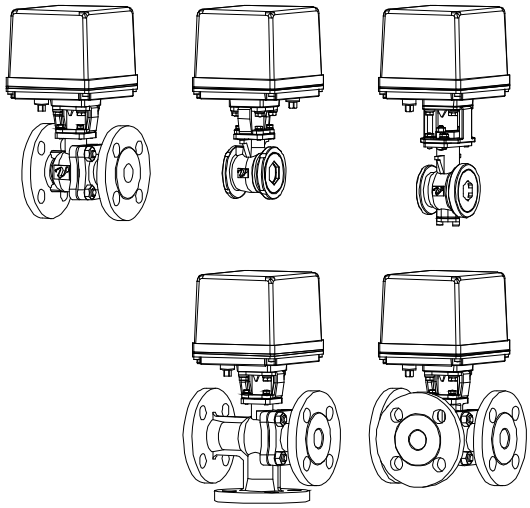
Electric Actuated Ball Valve BR BS GS VR TR LR L3

SP-1531

Please read this manual before installation and use.

GENERAL

It composed of flange-end ball valve and high-power electric actuator. (proportional control)



Actuator

- AEX : For AC power.
- PEX : For AC / DC power.

Valve

- BR type For various fluids and general use.
- BS type For Wafer
- VR type For control
- GS type For Wafer. (JIS 10K / 20K)
- TR type For mixing / dividing.
- LR type For mixing / dividing.
- L3 type Trunnion structure. (L)

PRODUCT CODE

		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)		(9)		(10)		(11)
BR type			B	R						-		-		-	
BS type	(Full port)		B	S		1				-		-		-	
	(Standard port)		B	S		1				R		-		-	
VR type			V	R		1	U	U		-		-		-	
	(Standard port)		V	R		1	U	U		R	0 1 5	-		-	
GS type	(V-port)		G	S		3	U	U		V		-		-	
	(Full port)		G	S		3	U	U		-		-		-	
	(Standard port)		G	S		3	U	U		R		-		-	
TR type			T	R		1	T	T	P	-		-		-	
LR type			L	R		1	T	T	P	-		-		-	
L3 type			L	3		1	T	T	G	-		-		-	

(1) Actuator
AEX
PEX

(2) Valve
BR BS VR GS
TR LR L3

(3) Voltage
1 : 100 / 110 V AC
2 : 200 / 220 V AC
6 : 100 to 240 V AC
0 : 24 V DC

(4) Sizing code
0 : Standard
1 : Light
2 : Heavy

(5) Connection
1 : JIS 10K
3 : JIS 20K

(6) Body material
T : SCS13A
U : SCS14A

(7) Ball material
T : SUS304 / SCS13A
U : SUS316 / SCS14A

(8) Seat material
F : F-PTFE
G : R-PTFE
R : R-F-PTFE
K : PEEK
I : API
C : R-PEEK
M : SUS316 + Stellite
P : R-PTFE

(9) Size [mm]
ex. 25 A → 025

(10) Option
EA : Alarm output board
EI : 4 to 20 mA Indication signal board
L0 : Auxiliary limit switch
L2 : Auxiliary limit switch

(11) Operation mode
Nil : Mode A
J : Mode B

(11) Input signal (AEX)
It corresponds to various control input signals.

VALVES SPECIFICATIONS

Water Oil Air, Gas Steam Chemicals Sea water Slurry Negative pressure

BR BS type

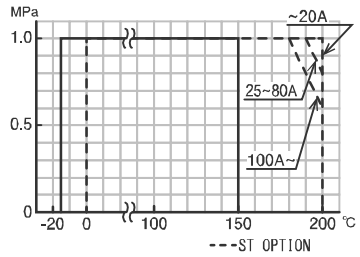
Valve type		BR			BS		
Design		2-way, Full port			2-way, Wafer		
					Full port		Standard port
Connection		JIS10K Flanged-end		JIS20K Flanged-end	JIS Flanges 10K		
Fluid							
Max pressure		1 MPa		2 MPa	1 MPa		
Size [mm]		015 to 100	015 to 150	015 to 080	015 to 80		R100 to R150
Material	Body	SCS14A	SCS13A	SCS13A	SCS13A	SCS14A	SCS13A
	Ball	SCS14A	SCS13A	SCS13A	SCS13A	SCS14A	SCS13A
	Seat	F-PTFE R-PTFE R-F-PTFE			F-PTFE R-PTFE R-F-PTFE		
Stem seal	Packing	R-PTFE			R-PTFE		
	O-ring	FKM			FKM		

The optional for steam fluids.

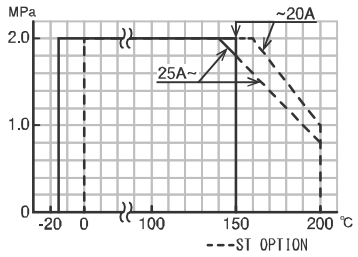
Valve type	Option code	O-ring
BR BS	ST	Replace (Steam resistant FKM)

PRESSURE & TEMPERATURE RATING

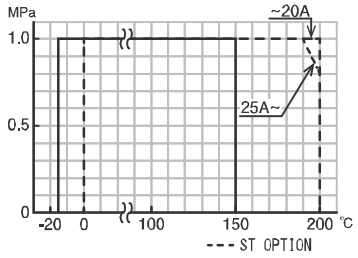
BR (JIS 10K)



BR (JIS 20K)



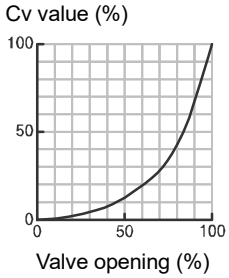
BS



Note) Insulation options are required for use with fluids more than 150 °C.

INHERENT FLOW CHARACTERISTIC (BS)

R100 to R150 mm



Range ability 30:1

VALVES SPECIFICATIONS

Water Oil Air, Gas Steam Chemicals Sea water Slurry Negative pressure

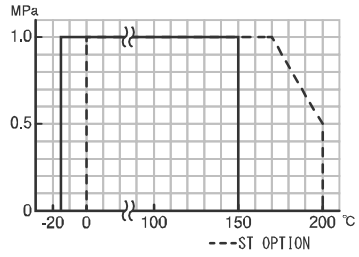
VR type

Valve type		VR	
Design		2-way, V-port	
Connection		JIS10K Flanged-end	
Fluid			
Max pressure		1 MPa	
Size [mm]		R015	015 to 080
Material	Body	SCS14A	
	Ball	SUS316	SCS14A
	Seat	R-PTFE	R-F-PTFE
Stem seal	Packing	R-PTFE	
	O-ring	FKM	

The optional for steam fluids.

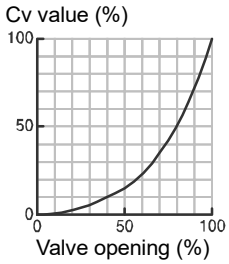
Valve type	Option code	O-ring
VR	ST	Replace (Steam resistant FKM)

PRESSURE & TEMPERATURE RATING



Note) Insulation options are required for use with fluids more than 150 °C.

INHERENT FLOW CHARACTERISTIC



Range ability

VR-1UUG R 015 100:1

VR-1UUG - 015 to 080 50:1

VALVES SPECIFICATIONS

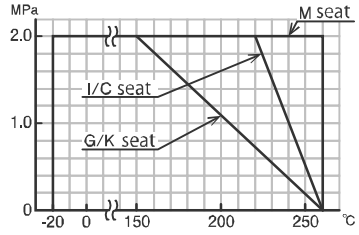
Water Oil Air, Gas Steam Chemicals Sea water Slurry Negative pressure

GS type

Valve type		GS		
Design		2-way, Wafer		
		V-port	Full port	Standard port
Connection		JIS Flanges 10K / 20K		
Fluid				
Max pressure		2 MPa		
Size [mm]		V015 to V032	015 to 080	R040 to R150
Material	Body	SCS14A		
	Ball	SCS14A (HCr plated)		
	Seat	R-PTFE PEEK API R-PEEK SUS316 + Stellite		
Stem seal	Packing	R-PTFE		

Note) API cannot be used with steam fluid.

PRESSURE & TEMPERATURE RATING

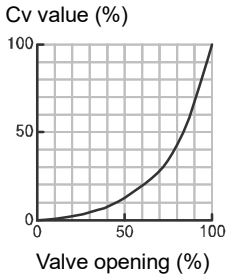


Note) • Option for use in fluid temperature more than 170 °C.
• We prefer to K seat depends on pressure or environmental conditions. Please consult us for your specifications.

SEAT LEAKAGE VOLUME (JIS B 2005-4)

	Seat material	Leakage rate	Remarks
G	R-PTFE	None	
K	PEEK		
I	API		
C	R-PEEK	10^{-4} × rated Cv value × 10^{-3} or less.	Class IV × 10^{-3} or less.
	R-PEEK (V-port)	10^{-4} × rated Cv value × 10^{-3} × 8 or less.	Class IV × 10^{-3} × 8 or less.
M	SUS316 + Stellite	10^{-4} × rated Cv value or less.	Class IV or less.
	SUS316 + Stellite (V-port)	10^{-4} × rated Cv value × 8 or less.	Class IV × 8 or less.

INHERENT FLOW CHARACTERISTIC



Range ability

GS-3UU□ V 015 to 032	50:1	(V-port)
GS-3UU□ - 015 to 080	200:1	(Full port)
GS-3UU□ R 040 to 150	100:1	(Standard port)

VALVES SPECIFICATIONS

Water Oil Air, Gas Steam Chemicals Sea water Slurry Negative pressure

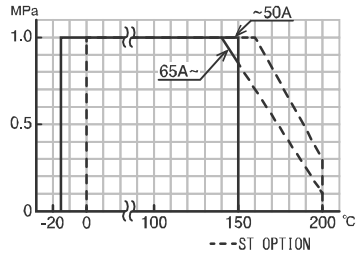
TR LR type

Valve type		TR LR	
Design		3-way, Full port	
Connection		JIS10K Flanged-end	
Fluid			
Max pressure		1 MPa	
Size [mm]		020 to 040	050 to 100
Material	Body	SCS13A	
	Ball	SUS304	SCS13A
	Seat	R-PTFE	
Stem seal	Packing	R-PTFE	
	O-ring	FKM	

The optional for steam fluids.

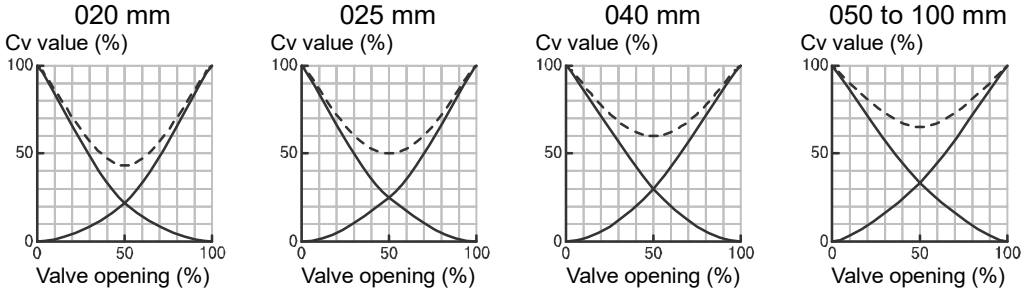
Valve type	Option code	O-ring
TR LR	ST	Replace (Steam resistant FKM)

PRESSURE & TEMPERATURE RATING



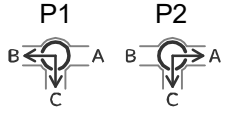
Note) Insulation options are required for use with fluids more than 150 °C.

INHERENT FLOW CHARACTERISTIC



Range ability 20:1

FLOW PATHS (Position① / P1) (Position② / P2)



B-C ⇔ A-C

Note) When a closed path is exposed to high pressure, it may leak slightly to an open path.

VALVES SPECIFICATIONS

Water Oil Air, Gas Steam Chemicals Sea water Slurry Negative pressure

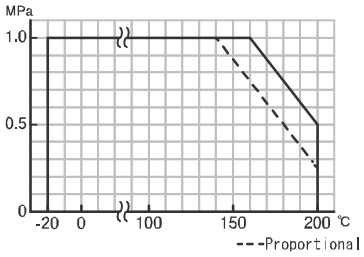
L3 type

Valve type		L3
Design		3-way, Full port
Connection		JIS10K Flanged-end
Fluid		
Max pressure		1 MPa
Size [mm]		025 to 150
Material	Body	SCS13A
	Ball	SCS13A
	Seat	R-PTFE
Stem seal	Packing	PTFE

The optional for steam fluids.

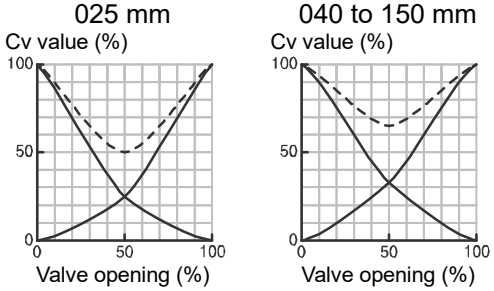
Valve type	Option code	O-ring
L3	ST-VF	Add (Steam resistant FKM)

PRESSURE & TEMPERATURE RATING



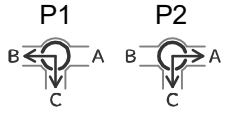
Note) Insulation options are required for use with fluids more than 170 °C.

INHERENT FLOW CHARACTERISTIC



Range ability 30:1

FLOW PATHS (Position① / P1) (Position② / P2)



B-C ⇔ A-C

ELECTRIC ACTUATOR SPECIFICATIONS

3 way valve: SHUT / Position①, OPEN / Position②

AEX type

Actuator type (□:Voltage code)	AEX-120-□	AEX-360-□	AEX-700-□	AEX-02K-□	AEX-06K-□
Voltage	100 / 110 AC V ±10 % 50/60 Hz (Code: 1) 200 / 220 AC V ±10 % 50/60 Hz (Code: 2)				
Rated torque [N·m]	12	36	70	200	600
Operation time [s]	30 / 25 (50/60 Hz)	36 / 30 (50/60 Hz)	72 / 60 (50/60 Hz)	77 / 64 (50/60 Hz)	77 / 64 (50/60 Hz)
Power consumption [VA]	9.5	13		45	220
Motor	Synchronous motor (Triac control)			Reversible motor (Triac control)	
Overload protection	Timer				
Method of operation	Proportional control				
Input signal	4 to 20 mA / 1 to 5 V (Input resistance: 250 Ω) (Standard) 0 to 5 V / 0 to 10 V / 2 to 10 V (Input resistance: more than 1 M Ω) 0-135 Ω to 0-1 kΩ Potentiometer input (Applied voltage: 5 V DC)				
Operation *1	[Mode A] SHUT by decreased signal (Standard) OPEN by increased signal [Mode B] SHUT by increased signal OPEN by decreased signal [Forced open / shut] It takes priority over the input signal. C-S is ON → SHUT. (Common in mode A / B) C-O is ON → OPEN.				
Indication signal	0 mA : SHUT ↔ 1 mA : OPEN (External load resistance: less than 3 kΩ) Common in mode A / B				
Override switch	It takes priority over the input signal. Common in mode A / B Dry contact / Transistor, Open collector. (Input signal current: 6 mA 15V DC)				
Operating range	SHUT: 0 to 40% OPEN: 50 to 100%				
Resolution	Less than 0.2%				
Duty cycle	100 %				
Ambient temperature	-20 to 55°C				
Space heater	2 W				
Manual operation	Manual shaft				
Enclosure	Equivalent to IP65 (IEC 60529)				
Housing material	Aluminum alloy die cast (acrylic resin baking finish)				
Wire connection	Terminal Block: M3, Ground terminal: M3				
Conduct port	2-G1/2 Attachments: Cable gland (for Φ6 to 12 mm cable), plug.				

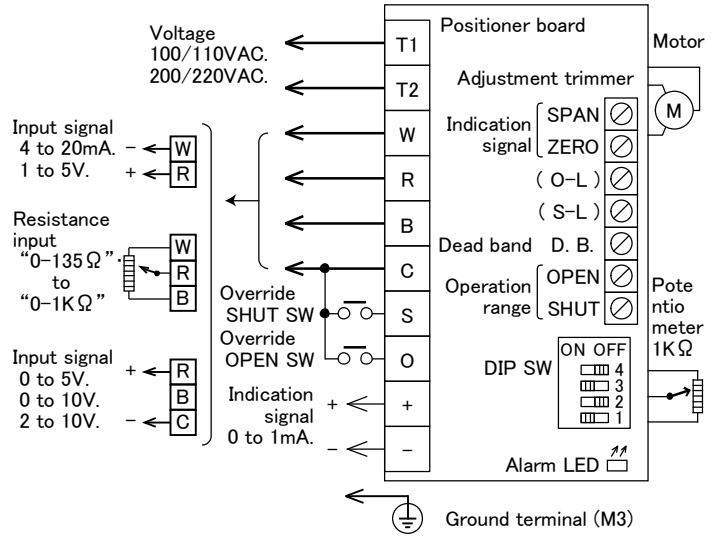
*1 Change by DIP switch. (Standard → Potentiometer input or 0 to 5 V / 0 to 10 V / 2 to 10 V)
*2 Change by DIP switch. (Standard → Mode B)

ELECTRIC ACTUATOR SPECIFICATIONS

3 way valve: SHUT / Position①, OPEN / Position②

WIRING

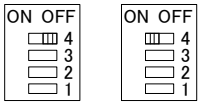
AEX



Setting with DIP SW

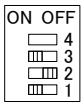
• Operation

Mode A Mode B

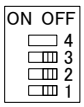


• Input signal

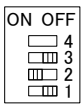
4 to 20 mA / 1 to 5 V



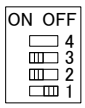
0-135 Ω to 0-1 kΩ Potentiometer input / 0 to 5 V



0 to 10 V



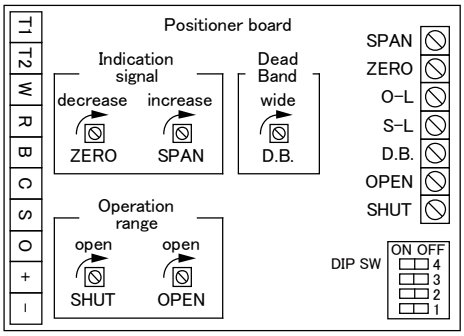
2 to 10 V



Note • Input signal circuit is non-isolated. Do not connect DC (minus) wire to other DC (minus) common.
• Do not adjust the "O-L" and "S-L" trimmer. It is adjusted at the factory.

ADJUSTMENT OF ACTUATOR

AEX



① Dead band

Turn the trimmer clockwise for wide the dead band as necessary. It is useful to prevent the hunting reaction of actuator. *Each trimmer on a built-in control board.

② Operating range

Turn clockwise and adjust valve / damper to open side.

• Adjust the closed position by SHUT trimmer.
• Adjust the open position by OPEN trimmer.

ELECTRIC ACTUATOR SPECIFICATIONS

3 way valve: SHUT / Position①, OPEN / Position②

PEX type

Actuator type (□:Voltage code)	PEX-120-□	PEX-300-□	PEX-700-□
Voltage	100 to 240 V AC ±10 % 50/60 Hz (Code: 6) 24 V DC +20 % ~ -10 % (Code: 0) Cannot use a half or full-wave DC power supply.		
Rated torque [N·m]	10	21	50
Operation time [s]	2.5 to 4 (Max 12)	6 to 9 (Max 34)	12 to 18 (Max 68)
	The operation time is the time when it is operated by the override switch. Operation time with the override switch cannot be adjusted with S.C. trimmer. At factory shipment, the S.C trimmer is set to the fastest position.		
Power consumption [VA]	AC power 80 DC power 50		
Motor	Brushless DC motor (PWM Control)		
Overload protection	Current limiter		
Method of operation	Proportional control		
Input signal	4 to 20 mA / 1 to 5 V (Input resistance: 250 Ω)		
Operation *1	[Mode A] SHUT by decreased signal (Standard) OPEN by increased signal [Mode B] SHUT by increased signal (Option: J) OPEN by decreased signal [Forced open / shut] It takes priority over the input signal. C-S is ON → SHUT. (Common in mode A / B) C-O is ON → OPEN.		
Indication signal	0 mA : SHUT ↔ 1 mA : OPEN (External load resistance: less than 3 kΩ) Common in mode A / B		
Override switch	It takes priority over the input signal. Common in mode A / B Dry contact / Transistor, Open collector. (Input signal current: 6 mA 15V DC)		
Operating range	SHUT: 0 to 40 % OPEN: 50 to 100 %		
Resolution	Less than 0.2 %		
Duty cycle	100 %		
Ambient temperature	-20 to 55 °C		
Space heater	3 W		
Manual operation	Manual shaft		
Enclosure	Equivalent to IP65 (IEC 60529)		
Housing material	Aluminum alloy die cast (acrylic resin baking finish)		
Wire connection	Terminal Block: M3, Ground terminal: M3		
Conduct port	2-G1/2 Attachments: Cable gland (for Φ6 to 12 mm cable), plug.		

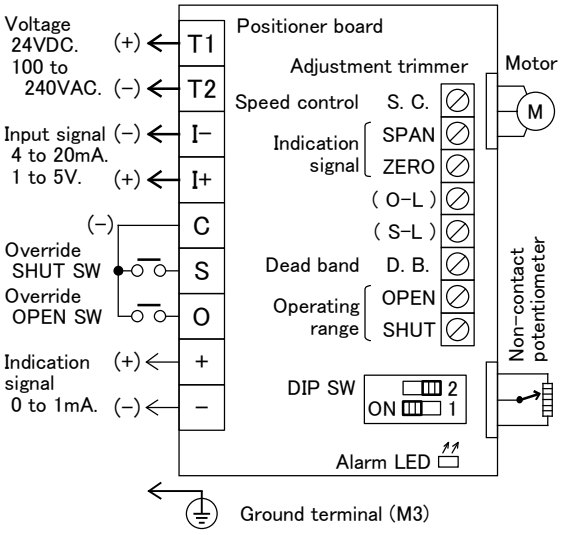
*1 Change by DIP switch. (Standard → Mode B)

ELECTRIC ACTUATOR SPECIFICATIONS

3 way valve: SHUT / Position①, OPEN / Position②

WIRING

PEX



Setting with DIP SW

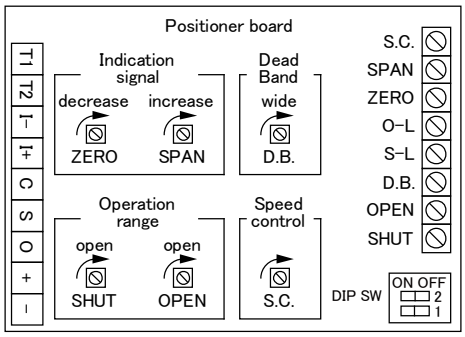
• Operation

Mode A (Standard) Mode B

Note • Do not adjust the "O-L" and "S-L" trimmer. It is adjusted at the factory.
• Minus terminal can be used in common, but T2 terminal for DC power supply is not a common terminal.

ADJUSTMENT OF ACTUATOR

PEX



① Dead band
Turn the trimmer clockwise for wide the dead band as necessary. It is useful to prevent the hunting reaction of actuator. *Each trimmer on a built-in control board.

② Operating range
Turn clockwise and adjust valve/damper to open side.
• Adjust the closed position by SHUT trimmer.
• Adjust the open position by OPEN trimmer.

③ Operating speed (Speed control)
Slow by turn the S.C. trimmer counterclockwise.
Fast by turn the S.C. trimmer clockwise.

Note) The operation time is the time when it is operated by the override switch.
Operation time with the override switch cannot be adjusted with S.C. trimmer.
At factory shipment, the S.C trimmer is set to the fastest position.

ELECTRIC ACTUATOR SPECIFICATIONS

3 way valve: SHUT / Position①, OPEN / Position②

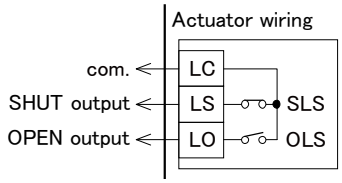
OPTIONAL PARTS

Specifications		Code No.	AEX	PEX	Remarks
Input signal and operation	4 to 20 mA or 1 to 5 V	Nil	○	○	Mode A (Standard)
		J	○	○	Mode B
	0-135 Ω to 0-1 kΩ Potentiometer input or 0 to 5 V	F	○		Mode A
		K	○		Mode B
	0 to 10 V	G	○		Mode A
		N	○		Mode B
	2 to 10 V	H	○		Mode A
		M	○		Mode B
Auxiliary limit switch (Select limit switch depending on the load)		L0	○	○	For standard signal
		L2	○	○	For micro load signal
Alarm output board		EA	○	○	EI and EA cannot be used together.
4 to 20 mA Indication signal board		EI	○	○	

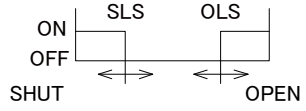
*Auxiliary limit switch: Please refer to the specifications.

WIRING (OPTION)

L0, L2 Auxiliary limit switch

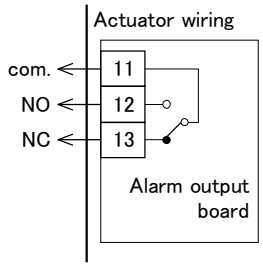


At CLOSE side, LC and LS is ON.
At OPEN side, LC and LO is ON.



ON point can be reset by adjusting the cam.

EA Alarm output board



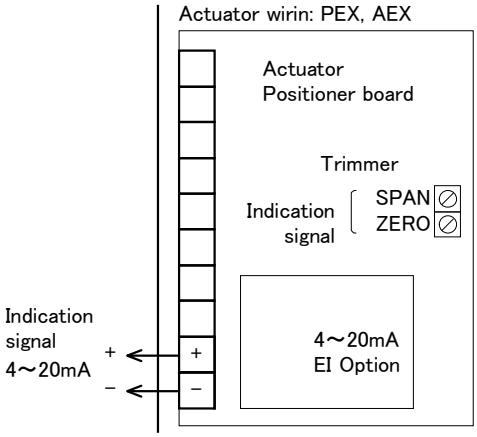
NO : Normally open
NC : Normally closed

Alarm SW will be ON, when overload protector works.

Error → 11 and 12 is ON.
Normal → 11 and 13 is ON.

Cannot be used with EI option.

EI 4 to 20 mA Indication signal board

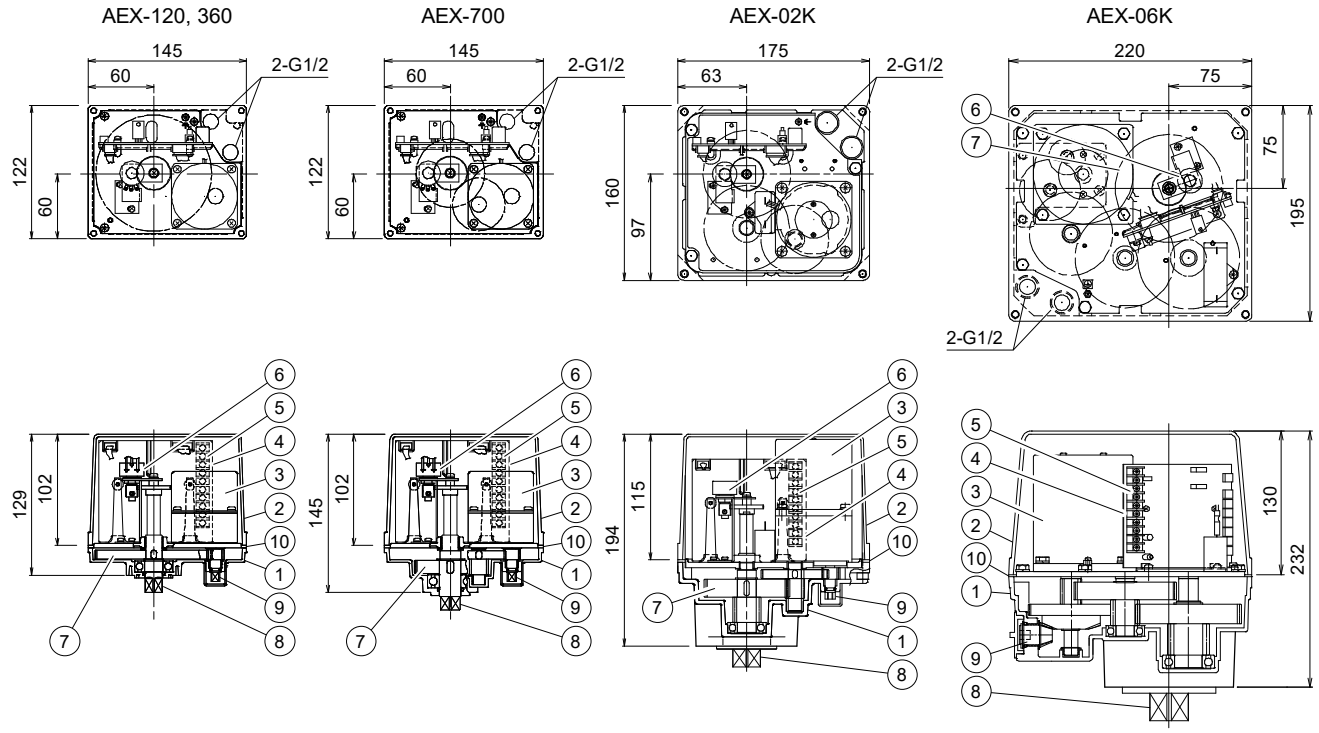


EI option board output an isolated indication signal from the plus and minus terminal with 4 to 20 mA by AEX / PEX positioner board.

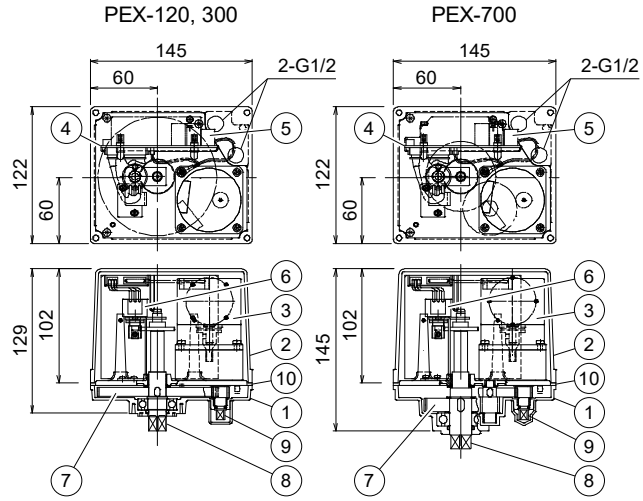
ELECTRIC ACTUATOR SPECIFICATIONS

DIMENSIONS

AEX



PEX



Parts name

1	Body	4	Control board	7	Drive gear	10	Rubber packing
2	Motor cover	5	Terminal block	8	Drive shaft		
3	Motor	6	Potentiometer	9	Manual shaft		

HANDLING & STORAGE

①HANDLING

Do not drop or throw the product as it may break.

②STORAGE

- Store away from dust, moisture and direct sunlight. If possible, store in the original package.
- Do not remove a dust proof cap until the piping.

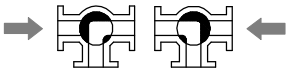
③CHECKING

- Check the product code, power supply, and voltage before installation.
- Make sure that the bolts are not loose.
- The DIP switch should be set up before the power is turned on. Do not touch unnecessary switches.

INSTALLATION

①PRECAUTIONS

- Flush the pipeline carefully before installing the valve. Foreign particles, such as sand or pieces of welding electrode, will damage the ball and seats.
- For valves with specified flow direction (GS, VR) or with ST / SC option, check the arrows on the product before piping.
- When the flow path is subjected to a high pressure from arrow, it may leak slightly to the low pressure port. (TR, LR)



②PIPING FLANGES

- Gasket should be selected appropriately to suit the fluid, pressure and temperature.
  Use spring washer to prevent from decreasing surface pressure gasket when the temperature change happens frequently.
- Tighten all bolts using crossover method to load the joint evenly.
- Wafer type ball valve is put between two seats of flanged-end and tightened with long bolts. (BS, GS)

③ENVIRONMENT

- Do not install in place where corrosive gas is present or where vibration is heavy (0.5 G or more).
- When radiant heat causes the surface temperature of the control unit to exceed 55 °C, provide an appropriate shielding plate.
- If there is a possibility that the fluid and drive part freeze, please take measures to prevent freezing.

④POSITIONING

Should be positioned through 90° upward from horizontal. Provide space around the product to allow manual operation, inspection and replacement work.

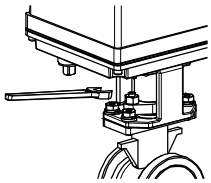
Maintenance space for upper part of actuator.	
AEX (120 / 360 / 700) PEX	More than 105 mm
AEX (02K / 06K)	More than 120 mm

⑤OTHER NOTES

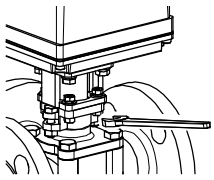
Until the wiring is completed there must be no condensation or flooding in the interior of the actuator, after piping. Protective caps on the cable gland are not waterproof.

⑥CAUTIONS FOR MAINTENANCE (GS, L3)

Do not keep warm for maintenance of the valve gland.



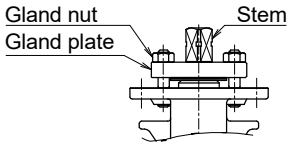
GS



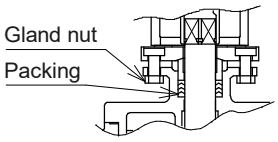
L3

TIGHTEN THE GLAND NUTS (GS, L3)

- Check that there is no leakage from the gland packing.
- If it leakage, tighten gland nuts by alternately. Do not over-tighten the gland nuts.



GS



L3

Valve size [mm]				Recommended torques [N·m]
GS			L3	
V015 V020	015 020	-	-	2
V025 V032	025 032	R040	025	3.5
-	040 050	R050 R065	040 050	7
-	065 080	R080 R100	065 080	10
-	-	R125 R150	100 125	14
-	-	-	150	20

WIRING

①PRECAUTIONS

- Remove the actuator cover before wiring.
- Two G1/2 electrical connections are provided with a cable gland and plug. Usable cable size is Φ6 to 12 mm.
- When using a flexible tube, dew condensation may occur inside the actuator due to respiration from the inside of the tube and malfunction may result. Seal the flexible tube connector part with a sealant.
- Sealants that affect the electrical contacts should not be used inside the electric actuator.
- If long distance wiring or low voltage operation, check that terminal voltage is in the proper range.
- AEX type input signal circuit is non-isolated. Do not connect DC (minus) wire to other DC (minus) common.
- PEX type minus terminal can be used in common, but T2 terminal for DC power supply is not a common terminal.

②CONNECTION

- Do not wiring outdoors on a rainy day.
- Check the power supply and voltage. Connect the signal as shown in the wiring diagram. Do not connect unnecessarily terminal.
- Check whether the MODE change DIP SW on a circuit board substrate is set up correctly.
- When wiring, if wiring of a signal is mistaken, it will not operate correctly. Contact us when you use two valve or more by one controller or indicator.
- Actuator should be electrically grounded. Use the terminal marked (⏚) inside the actuator.

PREVENT DEW CONDENSATION

- When installing the cover after wiring, perform the bolt by the temporary tightening procedure and the permanent tightening procedure to tightly and securely tighten the rubber packing so that water does not enter from the outside.
- Tighten the cable gland nut so that there is no leakage from the wire entrance.

CONTROL

①INPUT SIGNAL

- Use shielded wire for signal wiring where high level noise is generated or when the wiring distance is long.
- Control with a 1 to 5 V input signal becomes an input resistance 250 Ω. Provide a voltage that can safely 20mA or more than.

②DC POWER SUPPLY

- Cannot use a half or full-wave power supply.
- Consider an inrush current of motor. (It is 1.5 to 3 times of consumed current.)
- When using a DC voltage, be selected the wire thickness by the wiring distance.
- Do not use power supply that require more than 1 second with rise and fall time.

③INPUT SIGNAL AND OPERATION MODE

The input signal and operation mode are set as follows. (Factory shipped)

Input signal	4 to 20 mA or 1 to 5 V
Operation mode	Mode A
Operation	SHUT by decreased signal. OPEN by increased signal.

OPERATION

①TESTING

- Make sure that power supply voltage is correct. Also check operating position, wiring, speed and signals.
- During trial operation, check that valve movement and output signal are correct.

②CONFIRM THE OPERATING CONDITION

- Adjust fluid condition, controller setting, sensor etc. so that stable control is achieved.
- When used in an unstable control state, the life of the actuator and the valve will be shortened.
- The desired control state is stable at the target value. Adjust the PID setting value of the controller when overshooting the target value greatly, when not converging for a long time or hunting operation. Also, when the time delay is large, please consider the sensor position.

③ATTENTION

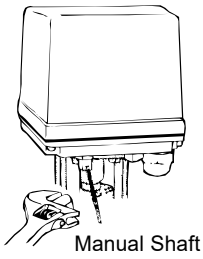
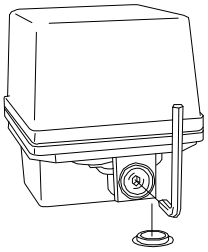
- Do not change an unnecessary dip switch.
- Keep power supplied for built-in space heater to prevent condensation inside actuator.
- Do not touch the moving parts of actuator in operation.
- Never put anything on the actuator or make it into a foothold.

MANUAL OPERATION

①PRECAUTIONS

- Be sure to turn off the power before manual operation.
- Operate manually with reference to the opening degree label. Do not turn beyond the fully open / fully closed position. Operation failure may occur during automatic operation.

②THE WAY OF OPERATION

AEX PEX	AEX (06K)
	
Turn manual shaft slowly with an adjustable wrench.	Remove the cap. Turn manual shaft solely with M8 hexagon socket screw keys.

Before automatic operation, be sure to remove the wrench.

MAINTENANCE

- To prevent electric shock, be sure to turn off the power when removing the actuator cover.
- Do the routine maintenance at least once in half a year.

Inspection items

- Confirm operation of opening and closing.
- Confirm that an actuator is not hot excessively.
- Confirm existence of abnormal noise and vibration during operation.
- Confirm whether screws are loose or not.
- Confirm that water or condensation no remains in the actuator.
- Confirm the fluid temperature or pressure.
- Confirm the leak from valve stem.
- Confirm the bolt tightening torque.

TROUBLE SHOOTING

Problem	Cause	Solution
Actuator does not move.	Faulty wiring.	Correct the wiring.
	Voltage and input signal are not coming.	Check the voltage and input signal.
	Incorrect voltage.	When it's burned out by excess voltage, replace the actuator.
	Connection or wiring is not correct.	Correct the miswiring and misconnection. Be careful not to mistake the plus and minus of wiring.
	Short the circuit, contact failure.	Review wires and connection.
	Motor is too old.	Replace the actuator. Repair in our factory.
Operation is unstable.	Excess surge or voltage was applied.	• Replace the control board or limit switch. (Repair in our factory) • Replace the actuator.
	Rainwater entered the actuator.	• Dry the inside. • Replace the actuator.
	Added high harmonics noise from an inverter.	Attachment a filter for each inverter maker option.
	Effect of high level noise.	Use the shielded wire and ground the wiring. Separate signal wire from power line.

Problem	Cause	Solution
Stop in the mid position. (Input signal 1 to 5 V)	Signal voltage source capacity shortage.	Use a voltage source that can be made to flow more than 20 mA. Please contact us.
Stop in the mid position.	• Biting of valve seat. • The scale has adhered to the valve ball.	Remove a foreign object.
	Overload protector runs because of over-torque.	Motor protection circuit returns by the signal of operation of an opposite direction. Turn on the power again.
Alarm LED is lit.		
Leakage from valve body	• Valve cap get loose. • Valve body is damaged.	Replace the valve.
Leakage from valve seat	Seat is worn or damaged.	Replace the valve.
		Replace the valve seat.
Leakage from valve stem	Stem packing is worn or distorted.	Replace the valve.
		Replace the packing.
Leakage from valve gland	Gland packing is worn or distorted.	Tighten the gland nut.
GS L3		Replace the gland packing.

For more information contact
NIPPON VALVE CONTROLS, INC. for consultation.

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